Appendix [posted as supplied by author]

Identification of Colorectal Cancer Screening Tests

To identify colonoscopies, sigmoidoscopies, and fecal occult blood tests (FOBTs), we used administrative and laboratory codes, including: Current Procedural Terminology (CPT); Healthcare Common Procedure Coding System (HCPCS); International Classification of Disease, Ninth Revision (ICD-9); and Logical Observation Identifiers Names and Codes (LOINC) (Appendix Table A). A similar approach has been used in prior studies of CRC screening that utilized electronic VA data.[1-3]

Appendix Table A: Codes Used to Identify Colorectal Cancer Screening Tests

Colonoscopy	
CPT codes	44388, 44389, 44390, 44391, 44392, 44393, 44394, 44397, 45378, 45379, 45380, 45381, 45382, 45383, 45384, 45385
HCPCS codes	G0105, G0121
ICD-9 codes	45.22, 45.23, 45.25, 45.41, 45.42, 45.43
Sigmoidoscopy	
CPT codes	45300, 45303, 45305, 45308, 45309, 45315, 45320, 45330, 45331,45332, 45333, 45334, 45337, 45338, 45339
HCPCS codes	G0104
ICD-9 codes	45.24, 48.22, 48.24, 48.26, 48.35, 48.36
FOBT	
LOINC codes	2335-8, 12503-9, 12504-7, 14563-1, 14564-9, 14565-6, 27396-1, 27401-9, 27925-7, 27926-5, 29771-3, 56490-6, 56491-4, 57905-2, 58453-2

CPT = Current Procedural Terminology; HCPCS = Healthcare Common Procedure Coding System; ICD-9 = International Classification of Disease, Ninth Revision; FOBT = fecal occult blood test; LOINC = Logical Observation Identifiers Names and Codes

Identification of Patients at Increased Risk for Colorectal Cancer

Patients were excluded if CPT or ICD-9 codes revealed any of the following diagnoses between FY00 and the qualifying FY10 visit (Appendix Table B): (1) prior colectomy; (2) history of colon polyps; (3) history of CRC; (4) history of inflammatory bowel disease (IBD); or, (5) family history of CRC. These exclusion criteria were selected to ensure that the cohort comprised individuals who were at average (rather than increased) risk for CRC.

Appendix Table B: Codes Used to Identify Patients at Increased Risk for Colorectal Cancer

Diagnosis	Code
Colectomy (CPT)	44150 - 44156, 44210 - 44212
CRC (ICD-9)	153.x, 154.0, 154.1, 154.8, V10.0, V10.05, V10.06
Colon polyps (ICD-9)	211.3, 211.4, 230.3, 230.4, V12.72
Inflammatory bowel disease (ICD-9)	555.x, 556.x
Family history of CRC (ICD-9)	V16.0
Anemia or gastrointestinal bleeding (ICD-9)	280.0, 280.1, 280.8, 280.9, 281.9, 285.1, 285.9, 569.3, 578.1, 578.9, 792.1

CPT = Current Procedural Terminology; ICD-9 = International Classification of Disease, Ninth Revision; CRC = colorectal cancer

Sensitivity Analysis to Assess the Impact of the FOBT Inclusion Criterion

Prior work has demonstrated that many Veterans (particularly those aged ≥ 65, who may be eligible for Medicare) obtain care not only from VA, but also from non-VA providers and facilities.[4] We therefore sought to ensure that our cohort comprised individuals who were likely to obtain CRC screening through VA by selecting individuals who had undergone prior negative FOBT screening in the 12-24 months prior to the FY10 visit (indicating that they had an established history of screening use in VA). We examined the impact of this FOBT-related

inclusion criterion in a sensitivity analysis by quantifying screening rates by age and health status (CCI) for those with *and* without prior FOBT (Appendix Table C). This analysis revealed similar results to our primary analysis (Table 2), with a marked decrease in screening use in individuals > 75 years of age.

Appendix Table C: Sensitivity Analysis: Unadjusted and Adjusted* Relative Risks and Screening Rates by Age and Health Status, Without Prior Negative FOBT Inclusion Criterion (N = 1,895,678)

	Unadjusted		Adjusted	
Predictor Variable	RR (95% CI)	Screening Rate, % (95% CI)	RR (95% CI)	Screening Rate, % (95% CI)
Age (years)				
50-69	1 (reference)	24.7 (24.6-24.7)	1 (reference)	22.8 (21.6-24.1)
70-75	0.69 (0.66-0.72)	17.1 (16.9-17.2)	0.74 (0.71-0.77)	16.8 (15.6-18.2)
> 75	0.22 (0.20-0.25)	5.5 (5.4-5.5)	0.24 (0.22-0.27)	5.6 (4.8-6.3)
CCI				
0	1 (reference)	17.8 (17.7-17.9)	1 (reference)	14.0 (12.9-15.1)
1-3	0.92 (0.91-0.93)	16.3 (16.3-16.4)	0.92 (0.91-0.93)	12.9 (11.9-13.9)
≥ 4	0.94 (0.92-0.98)	16.8 (16.6-16.9)	0.92 (0.89-0.95)	12.9 (12.0-13.8)

* Adjusted for gender and number of primary care visits in FY10; RR = relative risk; CI = confidence interval; CCI = Charlson comorbidity index

Sensitivity Analysis to Assess the Impact of the Outcome Variable

In our primary analysis, we determined whether any screening test (FOBT, sigmoidoscopy, or colonoscopy) was completed within 24 months after the qualifying FY10 visit (primary outcome variable). For this primary analysis, we excluded patients at increased risk of CRC, such as those with a prior history of colon adenomas, who may be eligible for high-risk surveillance colonoscopy (using the codes listed in Appendix Table B). However, some individuals may have still undergone a colonoscopy, sigmoidoscopy, or FOBT for non-screening

(diagnostic) purposes. We therefore performed a sensitivity analysis excluding tests that may have been performed for non-screening indications. To identify colonoscopies and sigmoidoscopies performed for non-screening indications, we utilized an algorithm previously developed by Fisher, et al, using VA administrative data.[2] To identify non-screening FOBTs, we excluded patients in whom ICD-9 codes revealed an anemia or bleeding diagnosis in the 3 months prior to the FOBT (Appendix Table B). As expected, the exclusion of additional screening tests resulted in somewhat lower screening rates than in our primary analysis (Table 2), but the key findings were unchanged, with a marked decrease in screening use in individuals > 75 years of age (Appendix Table D).

Appendix Table D: Sensitivity Analysis: Unadjusted and Adjusted* Relative Risks and Screening Rates by Age and Health Status, With Exclusion of Tests Performed for Diagnostic Indications (N = 399,067)

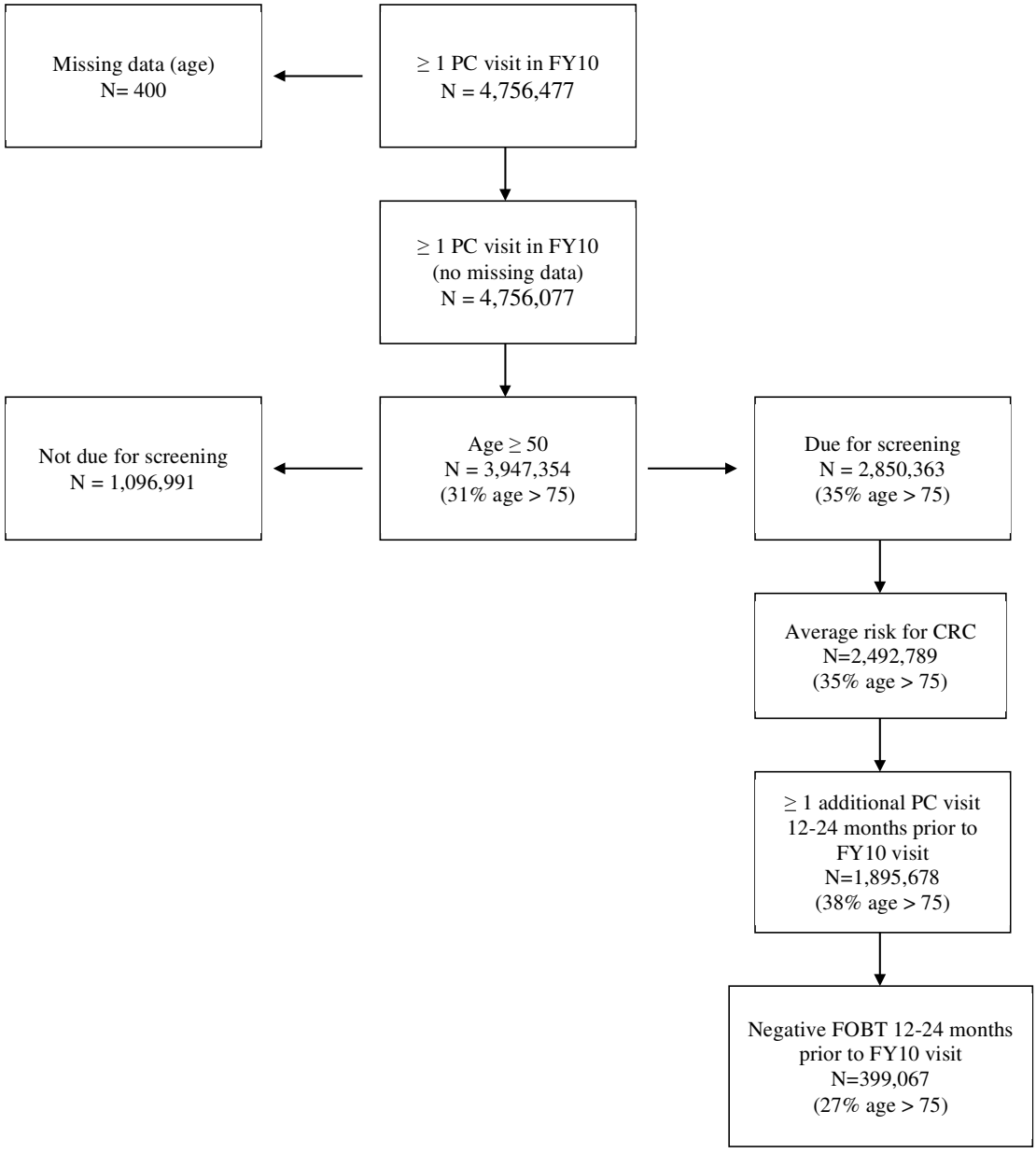
	Unadjusted		Adjusted	
Predictor Variable	RR (95% CI)	Utilization, % (95% CI)	RR (95% CI)	Utilization, % (95% CI)
Age (years)				
50-69	1 (reference)	32.1 (31.9-32.3)	1 (reference)	31.4 (30.0-32.8)
70-75	0.99 (0.96-1.01)	31.7 (31.3-32.1)	1.0 (0.98-1.03)	31.7 (30.3-33.1)
> 75	0.33 (0.28-0.39)	10.6 (10.4-10.8)	0.34 (0.29-0.41)	10.7 (8.9-12.5)
CCI				
0	1 (reference)	31.5 (31.2-31.7)	1 (reference)	27.7 (26.2-29.2)
1-3	0.83 (0.82-0.84)	26.2 (26.1-26.4)	0.87 (0.86-0.89)	24.2 (22.8-25.5)
≥ 4	0.58 (0.56-0.59)	18.1 (17.8-18.4)	0.64 (0.62-0.66)	17.8 (16.8-18.7)

* Adjusted for gender and number of primary care visits in FY10; RR = relative risk; CI = confidence interval; CCI = Charlson comorbidity index

Appendix Figure A

Title: Study Flowchart

Caption: PC = primary care; FY = fiscal year; CRC = colorectal cancer; FOBT = fecal occult blood testing.



APPENDIX REFERENCES

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